

REMARKS

This amendment is filed in response to the Office Action dated February 18, 2009. In view of these amendments and remarks, this application should be allowed and the case passed to issue. No new matter is introduced by this amendment. The amendment to claim 1 is supported by the specification at page 19, lines 1-12 and page 53, lines 13-16.

Claims 1, 3-9, 14, and 16-18 are pending in this application. Claims 1, 3-9, and 14-18 are rejected. Claim 1 is amended in this response. Claim 15 has been canceled in this response. Claim 2 and 10-13 were previously canceled.

Claim Rejections Under 35 U.S.C. § 112

Claims 1, 3-9, and 14-18 were rejected under 35 U.S.C. § 112, first paragraph, because the specification allegedly does not enable the broad scope of the claims. This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested.

The Office has not met the burden of establishing a *prima facie* case of lack of enablement. The Office Action maintained that only one compound, $\text{LiCo}_{1/3}\text{Ni}_{1/3}\text{Mn}_{1/3}\text{O}_2$, is enabled by the disclosure. The Office appears to be basing its conclusion on the reasoning that only one compound is exemplified. The Office, however, has provided no evidence or any basis as to why the claims are not enabled. It is not sufficient to merely argue that a claim is broad to allege lack of enablement. Further, the Office Action is mistaken that only one compound is exemplified. The specification teaches several examples of different positive electrode active materials in Table 5 on page 54. The Examiner noted that the specification does not disclose the Examples of Table 5 as being “uniformly dispersed at the atomic level.” The Examiner, however, has no basis for asserting that the compounds in Table 5 are not uniformly dispersed at the atomic level. Furthermore, it is clear from the written description that the Examples in Table

5 are examples of the present invention (see page 55). In addition, the specification teaches a number of similar compounds that are outside the scope of the present claims in Table 1. Though the Office Action included an analysis of the allegedly relevant *In re Wands* factors in reaching the determination of lack of enablement, all of the analyses appear to be based on the alleged only one example. The Office is directed to the detailed explanation of how to form the claimed cathode active materials on pages 23-31 of the present specification. Though results in the chemical art are often unpredictable, there is much published literature and patents on the topic of lithium composite oxides for lithium ion batteries, therefore many examples are not needed to enable the claimed invention to one of ordinary skill in this art. As regards the examples in Table 5, it would have been clear to one of ordinary skill in this art that the materials are uniformly dispersed, as the present specification teaches how to form the uniformly dispersed material and the Examples are formed according to the disclosed method.

The Federal Circuit has made it clear that it is improper to limit patent claims to only the disclosed examples. *Home Diagnostics v. Lifescan, Inc.*, 381 F.3d 1352 (Fed. Cir. 2004); *see also Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898 (Fed. Cir. 2004).

Furthermore, the rejections of claims 15-18 are strongly traversed. These claims are narrower in scope than claim 1. The rejections of claims 17 and 18, in particular, are strenuously traversed, as these claims are directed to the species that the Examiner indicated was enabled. Though applicants believe the claims to be fully enabled, in order to advance prosecution in this application, the limitation of previously presented claim 15 has been added to claim 1.

A feature of the present invention is that the composite oxide has a twining portion as shown in the TEM of Fig. 2. The twining portion is achieved when the nickel, manganese, and cobalt elements are uniformly dispersed at the atomic level. The present specification discloses a

method for obtaining the state in which nickel, manganese, and cobalt elements are uniformly dispersed at the atomic level. To obtain uniform dispersion of the elements at the atomic level oxidation of Mn is prevented (specification, page 24, lines 5-12; page 28, line 18 to page 29, line 1). In addition, the present specification teaches rapid heating and quenching as effective methods for forming the twining portion (page 28, lines 6-17). By referring to the present specification one of ordinary skill in this art would be able to prepare a coprecipitated hydroxide of various compositions including Ni, Mn, and Co, and to form the twining portion by means of a baking process.

As explained in MPEP 2164.04, in order to make a rejection under the Enablement requirement:

the examiner has the initial burden to establish a reasonable basis to question the enablement provided for the claimed invention. *In re Wright*, 999 F.2d 1557, 1562, 27 USPQ2d 1510, 1513 (Fed. Cir. 1993) (examiner must provide a reasonable explanation as to why the scope of protection provided by a claim is not adequately enabled by the disclosure). A specification disclosure which contains a teaching of the manner and process of making and using an invention in terms which correspond in scope to those used in describing and defining the subject matter sought to be patented must be taken as being in compliance with the enablement requirement of 35 U.S.C. 112, first paragraph, **unless there is a reason to doubt the objective truth of the statements contained therein which must be relied on for enabling support.** Assuming that sufficient reason for such doubt exists, a rejection for failure to teach how to make and/or use will be proper on that basis. *In re Marzocchi*, 439 F.2d 220, 224, 169 USPQ 367, 370 (CCPA 1971). As stated by the court, ‘it is incumbent upon the Patent Office, whenever a rejection on this basis is made, to explain why it doubts the truth or accuracy of any statement in a supporting disclosure and to back up assertions of its own with acceptable evidence or reasoning which is inconsistent with the contested statement. Otherwise, there would be no need for the applicant to go to the trouble and expense of supporting his presumptively accurate disclosure.’ 439 F.2d at 224, 169 USPQ at 370 (emphasis added)..

As further explained by the Federal Circuit, the disclosure of a preferred embodiment does not disavow other embodiments within the scope of the claims. “A patentee may claim an invention broadly and expect enforcement of the full scope of that language absent a clear

disavowal or contrary definition in the specification.” *Home Diagnostics v. Lifescan, Inc.*, 381 F.3d 1352 (Fed. Cir. 2004); *see also Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898 (Fed. Cir. 2004).

Claim Rejections Under 35 U.S.C. §§ 102 and 103

Claims 1, 3-8, and 14-18 were rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Ohzuku et al. (*Chemistry Letters*, CL-010390, Vol. 30 (2001), No. 7, pp. 642-43) (Ohzuku et al. ('390)). The Examiner asserted that CL-010390 discloses a positive electrode material comprising $\text{LiCo}_{1/3}\text{Ni}_{1/3}\text{Mn}_{1/3}\text{O}_2$. In response to Dr. Yoshizawa's declaration, the Examiner argued that the declaration does not establish that the elements are distributed uniformly, because if they did they would be substantially monocolored with no high concentration of low concentration areas.

This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested. The following is a comparison between the present invention, as claimed, and the cited prior art.

An aspect of the present invention, per claim 1, is a positive electrode active material comprising a lithium-containing composite oxide containing at least nickel and manganese elements, said positive electrode active material comprising primary particles of the composite oxide having a twining portion, the composite oxide further contains cobalt element, and the nickel, manganese, and cobalt elements are uniformly dispersed at the atomic level. The composite oxide has a layered crystal structure and the arrangement of oxygen atoms is a cubic close-packed structure. The composite oxide contains nickel, manganese and cobalt elements at a ratio satisfying $\text{Co} / (\text{Ni} + \text{Mn}) \leq 1$.

The positive electrode active material of the present invention is not anticipated by or obvious in view of Ohzuku et al. ('390) because Ohzuku et al. ('390) do not disclose or suggest the composite oxide having a twining portion and the composite oxide further containing cobalt element, and the nickel, manganese, and cobalt elements are **uniformly dispersed** at the atomic level, and the composite oxide has a layered crystal structure and the arrangement of oxygen atoms is a cubic close-packed structure, as required by claim 1.

As explained in the declaration under 37 C.F.R. § 1.132 by Dr. Yoshizawa, which was filed February 20, 2007, positive electrode active material fabricated according to Chemistry Letters, CL-010390 exhibit a non-uniform elemental distribution. Exhibit A, as indicated by the widely-separated Co-rich and Co-poor areas, clearly shows a widely varying distribution of cobalt in the Chemistry Letters, CL-010390 positive electrode active material. In contrast thereto, Exhibits A and B clearly illustrate that cobalt is uniformly dispersed throughout the positive electrode material according to the present invention. As illustrated in Exhibits A and B, the material according to the present invention is clearly distinguishable over the prior art material.

In the micrographs attached to the declaration, red indicates a high concentration of the element being measured, green represents a low concentration, and yellow represents an intermediate concentration, for each of Ni, Mn, Co. Thus, the Co map only shows Co concentration, the Ni map only shows Ni concentration, and the Mn map only shows Mn concentration.

Because CoCO_3 and nickel manganese hydroxide are used as a raw material in CL-010390, segregation of Co is observed in the $\text{LiCo}_{1/3}\text{Ni}_{1/3}\text{Mn}_{1/3}\text{O}_2$. In contrast thereto, in the

present invention a triple hydroxide is used as the raw material (*see* page 24, lines 14-15) resulting in a favorable uniform dispersion of Co.

The Examiner asserted that Ohzuku et al. ('390) inherently disclose the claimed material. However, the fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993). "Inherency . . . may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999)(citations omitted). In view of the data presented in Dr. Yoshizawa's declaration it is clear that CL-010390 does not inherently disclose the positive electrode active material, as required by claim 1.

The Office Action reasoned that the declaration does not establish that the elements are distributed uniformly, because if they did they would be substantially monochromatic with no high concentration of low concentration areas. Dr. Yoshizawa's declaration, however, shows a significant difference between the uniform dispersal of the claimed composition and the prior art. The prior art has well-defined, widely-separated areas of high and low concentration, unlike the claimed material, which is much more uniformly dispersed. Dr. Yoshizawa's declaration establishes that Ohzuku et al. ('390) do not inherently disclose the claimed material. In view of the differences between the present invention and the cited prior art the Examiner's interpretation of "uniform dispersal" is clearly unreasonable.

The factual determination of lack of novelty under 35 U.S.C. § 102 requires the disclosure in a single reference of each element of a claimed invention. *Helifix Ltd. v. Blok-Lok Ltd.*, 208 F.3d 1339, 54 USPQ2d 1299 (Fed. Cir. 2000); *Electro Medical Systems S.A. v. Cooper*

Life Sciences, Inc., 34 F.3d 1048, 32 USPQ2d 1017 (Fed. Cir. 1994); *Hoover Group, Inc. v. Custom Metalcraft, Inc.*, 66 F.3d 399, 36 USPQ2d 1101 (Fed. Cir. 1995); *Minnesota Mining & Manufacturing Co. v. Johnson & Johnson Orthopaedics, Inc.*, 976 F.2d 1559, 24 USPQ2d 1321 (Fed. Cir. 1992); *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051 (Fed. Cir. 1987). Because Ohzuku et al. ('390) do not disclose positive electrode active material comprising primary particles of the composite oxide having a twining portion, containing cobalt element, and the nickel, manganese, and cobalt elements are uniformly dispersed at the atomic level, and the composite oxide has a layered crystal structure and the arrangement of oxygen atoms is a cubic close-packed structure, as required by claim 1, Ohzuku et al. ('390) do not anticipate claim 1.

Obviousness can be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Kahn*, 441 F.3d 977, 986, 78 USPQ2d 1329, 1335 (Fed. Cir. 2006); *In re Kotzab*, 217 F.3d 1365, 1370 55 USPQ2d 1313, 1317 (Fed. Cir. 2000); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992); *In re Fine*, F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). Ohzuku et al. ('390 and '813) do not suggest positive electrode active material comprising primary particles of the composite oxide having a twining portion, containing cobalt element, and the nickel, manganese, and cobalt elements are uniformly dispersed at the atomic level, and the composite oxide has a layered crystal structure and the arrangement of oxygen atoms is a cubic close-packed structure, as required by claim 1.

The only teaching of the claimed positive electrode active material comprising primary particles of the composite oxide having a twining portion, containing cobalt element, and the

nickel, manganese, and cobalt elements are **uniformly dispersed** at the atomic level, and the composite oxide has a layered crystal structure and the arrangement of oxygen atoms is a cubic close-packed structure, is found in Applicants' disclosure. However, the teaching or suggestion to make a claimed combination and the reasonable expectation of success must not be based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Claims 1, 3, 4, 6-8 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Ohzuku et al. ('390) in view of Ohzuku et al. (JP 2002-042813) (Ohzuku et al. (JP '813)).

Ohzuku et al. ('390) and Ohzuku et al. (JP '813), whether taken alone, or in combination, do not suggest the claimed positive electrode active material because Ohzuku et al. (JP '813) do not cure the above-noted deficiencies of Ohzuku et al. ('390). The present invention is further distinguishable over the cited references because Ohzuku et al. (JP '813) do not disclose forming the **three** transition metal composite oxide. Ohzuku et al. (JP '813) do not teach that the composite metal oxide includes Co, as required by claim 1. Claim 1 requires Ni, Mn, and Co in the composite metal oxide, whereas Ohzuku et al. ('813) teach the composite metal oxide comprises Ni and Mn. Ohzuku et al. ('813) do not disclose or suggest the composite metal oxide having a twining portion, the composite oxide further contains cobalt element, and the nickel, manganese, and cobalt elements are uniformly dispersed at the atomic level, and the composite oxide has a layered crystal structure and the arrangement of oxygen atoms is a cubic close-packed structure, as required by claim 1.

Claim 9 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Ohzuku et al. ('390) in view of Miyasaka (U.S. Pat. No. 6,416,902).

Claim 9 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Ohzuku et al. ('390) and Ohzuku et al. ('813) in view of Miyasaka.

The Examiner asserted that Ohzuku et al. ('390 and '813) do not disclose the claimed primary and secondary particles. The Examiner averred that Miyasaka discloses the primary and secondary particles and that it would have been obvious to make two different particle size distributions to enhance packing because the smaller particles would occupy the voids between the larger particles. The Examiner further pointed out that Miyasaka teaches that secondary particles consist of aggregated primary particles.

The combinations of Ohzuku et al. ('390 or '813) and Miyasaka do not suggest the claimed positive electrode active material and battery because Miyasaka does not cure the deficiencies of Ohzuku et al. ('390 and '813). Thus, claim 9 is allowable for at least the same reasons as independent claim 1.

Further, it appears that the Examiner may have misinterpreted the differences between primary and secondary particles. The Examiner apparently believes that primary and secondary particles are merely different-sized particles. However, as is clear from the present specification, and as is well-known in this art, secondary particles are formed from primary particles. Thus, there are not two different distributions of particles, as asserted by the Examiner. Rather, a plurality of primary particles of a first size together form a secondary particle of a second larger size.

The dependent claims are allowable for at least the same reasons as independent claim 1, and further distinguish the claimed positive electrode active material.

In view of the above amendments and remarks, Applicants submit that this application should be allowed and passed to issue. If there are any questions regarding this Amendment or the application in general, a telephone call to the undersigned would be appreciated to expedite the prosecution of the application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

McDERMOTT WILL & EMERY LLP



Bernard P. Codd
Registration No. 46,429

600 13th Street, N.W.
Washington, DC 20005-3096
Phone: 202.756.8000 BPC:MWE
Facsimile: 202.756.8087
Date: May 18, 2009

**Please recognize our Customer No. 20277
as our correspondence address.**